WHAT IS CLAIMED IS:

1. A system for monitoring a plurality of cell voltages of an electrochemical device for a plurality of cells connected in series, the system comprising:

(a) a plurality of connecting pins for removable connection across the plurality of cells;

(b) a plurality of differential amplifiers, each differential amplifier having a plurality of laser wafer trimmed resistors providing matching, so that common mode signals are rejected, while differential input signals are amplified, each differential amplifier having two inputs and one output, wherein the inputs are each connected to the plurality of connecting pins;

(c) a switching network having a plurality of inputs and one output, the inputs of the switching network connected to the outputs of the differential amplifiers;

(d) not more than one analog to digital converter per 16 cells having an input connected to the output of the switching network and adapted to provide digital values indicative of the voltages measured by the plurality of differential amplifiers; and

(e) a power supply to supply regulated power to at least one electrical circuit consisting of the differential amplifiers, switching network, and mixtures thereof, wherein the power supply derives its power from the plurality of cells.

2. The system of claim 1, further comprising a controller connected to the switching network and the analog to digital converter to control the operation of the switching network and the analog to digital converter, wherein the controller is further adapted to receive the digital values from the output of the analog to digital converter.

3. The system of claim 1, wherein the plurality of cells comprise fuel cells.

4. The system of claim 1, wherein the plurality of cells comprise battery cells.

5. The system of claim 1, wherein said plurality of cells have a cumulative maximum voltage of about 270 volts.

6. The system of claim 4, wherein each cell has a maximum voltage of about +/- 300 volts.

7. The system of claim 1, wherein said differential amplifiers each produce an output such that the voltage of a cell being measured is determined with an error of about 0.02 percent or less.

8. The system of claim 1, wherein said differential amplifiers each produce an output such that the voltage of a cell being measured is determined with a gain nonlinearity error of about 3 parts per million or less.

9. The system of claim 1, further comprising a single housing, wherein each system component is housed therein.

10. The system of claim 9, wherein each single housing and system component housed therein comprises a module for monitoring the voltage of least 16 cells, and further comprising at least 16 of the

modules configured to monitor cell voltages of least 256 cells of a single cell stack.

11. The system of claim 1, wherein the system further includes a calculating means, connected to the output of one of the analog to digital converters and the controller, to calculate the at least one cell voltage based on the digital values.

12. The system of claim 1, wherein each differential amplifier is adapted to reject a common-mode voltage of at least +/-270 volts.

13. The system as claimed in claim 1, wherein the controller comprises a microprocessor.

14. The system as claimed of claim 1, wherein the system further comprises a computer and the controller is connected to the computer.

15. A system for monitoring a plurality of cell voltages of a fuel cell stack or battery bank having a plurality of cells connected in series, the system comprising:

(a) a plurality of connecting pins for removable connection across the plurality of cells, the plurality of cells having a cumulative maximum voltage of at least about 225 volts;

(b) a plurality of differential amplifiers, each differential amplifier having a plurality of laser wafer trimmed resistors providing matching, so that common mode signals are rejected, while differential input signals are amplified, wherein said differential amplifiers each produce an output such that the voltage of a cell being measured is determined with an error of about 0.02 percent or less, each differential amplifier having two inputs and

one output, wherein the inputs are each connected to the plurality of connecting pins,

(c) a switching network having a plurality of inputs and one output, the inputs of the switching network connected to the outputs of the differential amplifiers;

(d) not more than one analog to digital converter per 16 cells having an input connected to the output of the switching network and adapted to provide digital values indicative of the voltages measured by the plurality of differential amplifiers;

(e) a power supply to supply regulated power to at least one electrical circuit consisting of the voltage dividers, differential amplifiers, switching network, and mixtures thereof, wherein the power supply derives its power from the plurality of cells; and

(f) a single housing, wherein each system component is housed therein.

16. The system of claim 15, wherein each single housing and system component housed therein comprises a module for monitoring the voltage of least 16 cells, and further comprising at least 16 of the modules configured to monitor cell voltages of least 256 cells of a single cell stack.

17. The system of claim 15, further comprising a controller connected to the switching network and the analog to digital converter to control the operation of the switching network and the analog to digital converter, wherein the controller is further adapted to receive the digital values from the output of the analog to digital converter.

18. The system of claim 15, wherein the plurality of cells comprise fuel cells.

19. The system of claim 15, wherein the plurality of cells comprise battery cells.

20. The system of claim 15, wherein said plurality of cells have a cumulative maximum voltage of not more than about 270 volts.

21. The system of claim 19, wherein each cell has a maximum voltage of about +/-300 volts.

22. The system of claim 15, wherein said differential amplifiers each produce an output such that the voltage of a cell being measured is determined with a gain nonlinearity error of about 3 parts per million or less.

23. The system of claim 15, wherein the system further includes a calculating means, connected to the output of one of the analog to digital converters and the controller, to calculate the at least one cell voltage based on the digital values.

24. The system of claim 15, wherein each differential amplifier is adapted to reject a common-mode voltage of at least +/-270 volts.

25. The system as claimed in claim 15, wherein the controller comprises a microprocessor.

26. A system for monitoring a plurality of cell voltages of a fuel cell stack having a plurality of cells connected in series, the system comprising:

(a) a plurality of connecting pins for removable connection across the plurality of cells, the plurality of cells having a cumulative maximum voltage of at least about 250 volts;

(b) a plurality of differential amplifiers, each differential amplifier having a plurality of laser wafer trimmed resistors providing matching, so that common mode signals are rejected, while differential input signals are amplified, wherein each differential amplifier is adapted to reject a common-mode voltage of at least +/-270 volts, wherein said differential amplifiers each produce an output such that the voltage of a cell being measured is determined with a gain nonlinearity error of about 3 parts per million or less, each differential amplifier having two inputs and one output, wherein the inputs are each connected to the plurality of connecting pins;

(c) a switching network having a plurality of inputs and one output, the inputs of the switching network connected to the outputs of the differential amplifiers;

(d) not more than one analog to digital converter per 16 cells having an input connected to the output of the switching network and adapted to provide digital values indicative of the voltages measured by the plurality of differential amplifiers;

(e) a power supply to supply regulated power to at least one electrical circuit consisting of the voltage dividers, differential amplifiers, switching network, and mixtures thereof, wherein the power supply derives its power from the plurality of cells; and

(f) a single housing, wherein each system component is housed therein.

27. The system of claim 26, wherein each single housing and system component housed therein comprises a module for monitoring the voltage of least 16 cells, and further comprising at least 16 of the modules configured to monitor cell voltages of least 256 cells of a single cell stack.

28. The system of claim 26, further comprising a controller connected to the switching network and the analog to digital converter to control the operation of the switching network and the analog to digital converter, wherein the controller is further adapted to receive the digital values from the output of the analog to digital converter.

29. The system of claim 26, wherein said plurality of cells have a cumulative maximum voltage of about 270 volts.

30. The system of claim 26, wherein each cell has a maximum voltage of about +/-1 volts.

31. The system of claim 26, wherein said differential amplifiers each produce an output such that the voltage of a cell being measured is determined with an error of about 0.02 percent or less.

32. The system of claim 26, wherein the system further includes a calculating means, connected to the output of one of the analog to digital converters and the controller, to calculate the at least one cell voltage based on the digital values.

33. The system as claimed in claim 26, wherein the controller comprises a microprocessor.

34. The system as claimed of claim 26, wherein the system further comprises a computer and the controller is connected to the computer.

35. A method for monitoring a plurality of cell voltages of an electrochemical device for a plurality of cells connected in series and having output terminals, the method comprising the steps of:

(a) connecting the voltages from the terminals of each cell to the inputs of a differential amplifier, each differential amplifier having a plurality of laser wafer trimmed resistors providing matching, so that common mode signals are rejected, while differential input signals are amplified, each differential amplifier having two inputs and one output;

(b) rejecting the common-mode voltage from the voltages at the terminal of each cell, in the differential amplifier, to give the voltage differential between the two terminals;

(c) converting the voltage differential from analog to digital values; and

(d) powering the differential amplifier with a power supply to supply regulated power, wherein the power supply derives its power from the plurality of cells.

36. The method as claimed in claim 35, the plurality of cells having a cumulative maximum voltage of at least about 250 volts.

37. The method as claimed in claim 35, which includes connecting the outputs of the differential amplifiers through a switching network to an analog to digital converter, using the switching network to switch the output of one of the differential amplifiers to the analog to digital

converter for analog to digital conversion of the voltage differential at the output of said one differential amplifier.

38. The method claim 35, further comprising connecting the switching network and the analog to digital converter to a controller to control the operation of the switching network and the analog to digital converter, wherein the controller is further adapted to receive the digital values from the output of the analog to digital converter.

39. The method of claim 35, wherein the plurality of cells comprise fuel cells.

40. The method of claim 35, wherein the plurality of cells comprise battery cells.

41. The method of claim 35, wherein said plurality of cells have a cumulative maximum voltage of about 270 volts.

42. The method of claim 35, wherein each cell has a maximum voltage of about +/-300 volts.

43. The method of claim 35, wherein said differential amplifiers each produce an output such that the voltage of a cell being measured is determined with an error of about 0.02 percent or less.

44. The method of claim 35, wherein said differential amplifiers each produce an output such that the voltage of a cell being measured is determined with a gain nonlinearity error of about 3 parts per million or less.

45. The method of claim 35, further comprising a single housing, wherein each system component is housed therein.

46. The method of claim 35, wherein the system further includes a calculating means, connected to the output of one of the analog to digital converters and the controller, to calculate the at least one cell voltage based on the digital values.

47. The method of claim 35, wherein each differential amplifier is adapted to reject a common-mode voltage of at least +/-270 volts.

48. The method as claimed in claim 35, wherein the controller comprises a microprocessor.

49. The method as claimed of claim 35, wherein the system further comprises a computer and the controller is connected to the computer.